915-121 Using the Internet to Synchronize Distributed Medical Databases

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Background: Medical data is kept in database systems more and more frequently. When patients are transfered for treatment among different medical facilities, synchronisation between distributed databases is necessary to avoid data reentry and optimize information flow. The Internet is available at most medical institutions, and can be used as a low cost medium for this task. Since it is a public transfer channel, emphasis must be put on data encryption and security.

Methods: We used ORACLE SQL Servers for database storage. On the servers, a change log is kept automatically for every data transaction. Servers in different locations can be grouped together in synchronisation clusters. Change logs are monitored by a program running on a Windows NT workstation in each location. At predifined intervals (e.g. at night to save cost for dial up connections), the data transfer to all databases in the synchronisation cluster is initiated. Data is encrypted during transfer using the "Blowfish" algorithm. This algorithm is highly secure (comparable to the DES standard) yet fast to implement. Security has been further enhanced by using a firewall to hide database servers and allowing access only to the dedicated synchronisation workstation.

Application: We implemented a synchronisation cluster with cathlab and research databases in three different locations. Internet connections were provided via ISDN (64 Kbit). During continuos update, synchronisation delay between the databases was below 10 Minutes.

916 Transesophageal Echocardiography in Cardiac Interventions and Congenital Heart Disease

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Anaheim Convention Center, Hall E
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916-77 Echocardiographic Determinants of Successful Deployment of the Das™ Angel Wings™ Atrial Septal Defect (ASD) Closure Device

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To outline the echocardiographic determinants associated with successful deployment of Das ASD closure device, we studied 64 patients enrolled in U.S. and International ASD closure trials by transesophageal echocardiography (TEE) during percutaneous closures. Mean age was 24.8 ± 17.2 years (mean ± SD) (range: 3 to 75 years) and mean weight was 53.4 ± 22.3 kg (range: 14 to 111 kg). A secundum ASD was present in 49 patients and a patent foramen ovale (PFO) in 15 patients. The dimension of the ASD or PFO by TEE was 12.5 ± 5.2 mm (range: 2.2 to 24.0 mm) and 3.5 ± 1.8 mm (range: 0 to 7.5 mm), respectively, whereas the stretched dimension of the ASD or PFO by balloon occlusion was 15.5 ± 4.0 mm and 13.0 ± 2.9 mm, respectively. ASD device was successfully deployed in 55 patients (86%). Deployment was unsuccessful in 9 patients, who underwent subsequent surgery. In the successful group, a significant (> 4 mm) residual defect was detected in only 3 patients. In the unsuccessful group, 1) ASD size by TEE was larger (14.4 ± 6.5 mm vs 9.7 ± 5.7 mm, $p < 0.05$), 2) Atrial septal thickness indexed to body surface area was lower (0.8 ± 0.5 vs 2.3 ± 0.8 mm/m^2, $p < 0.05$) and 3) Qp:Qs ratio was higher (3.0 ± 2.2 vs 1.9 ± 1.2, $p < 0.05$) compared to the successful group. The balloon occlusive diameters were not significantly different between the two groups (16.0 ± 4.8 vs 14.8 ± 3.7 mm, $p > 0.05$).

The following steps in deployment of the device were facilitated by TEE: 1) Positioning of tip of the delivery sheath, in mid left atrium, 2) Identification of a "T-sign" in the mid left atrium, produced by left atrial disc and delivery sheath at 90º to each other, which excluded snagging of left atrial disc by cardiac structures 3) Recognition of a corner of left atrial disc prolapsing across the ASD requiring repositioning of left atrial disc and 4) Optimal positioning of left atrial disc against atrial septum prior to deployment of the right atrial disc.

Conclusions: Our multicenter experience with the Das™ ASD device emphasizes the echocardiographic determinants of successful deployment of this device. These parameters may be used as guidelines for the successful deployment of this device.

916-78 Role of the Transesophagial Echocardiography in the Management of the Patients with Congenital Heart Disease

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From 1989 to 1995, 1973 TEE's were performed on 1548 patients. This study addresses the reliability and the impact of TEE in congenital heart disease (CHD). Age ranged from 1 day to 28 yrs (median 1.8 yrs). Location of studies: Operating room [OR] 303 (15%), ICU 1407 (71%), out-patient clinic 210 (11%), cath lab 53 (3%). Studies were biplane in 1325 and single plane 648. Overall mortality due to TEE was 0.1%. Major groups studied: RVOTO 18%, AVSD 13%, Fontan/Glenn 14%, primary VSD 11%, TGA 10%, and TAPVC 4%. Of the major groups undergoing surgery, the proportion who had a TEE was: RVOTO + VSD 91%, AVSD 81%, Fontan/Glenn 83%, primary VSD 39%, TGA 53%, and TAPVC 74%. For many patient groups the number of TEE's has decreased over time. TEE findings were confirmed in 201 cases either by repeat surgery or cardiac catheterization. A correct diagnosis was made in 178 (89%). Of the 23 (11%) incorrect diagnosis, 10 had branch PA stenoses, 5 a significant VSD leak, 3 proximal RVOTO, 2 LVOTO, 1 patent azygous vein, 1 Glenn stenosis, and 1 arch obstruction. Missed diagnoses decreased over time with no missed VSD or RVOTO in the last 2 years. Branch PA stenoses still poses a problem. Of 117 reoperations a TEE in the OR (n = 37) did not significantly reduce the mortality (32%) compared with the mortality (44%) for the 80 studied at ICU. *Conclusion:* TEE provides accurate data in post-operative CHD patients. Persistent problems still exist with the diagnosis of residual peripheral PA stenosis.

916-79 Primary Pulmonary Hypertension: Prognostic Value of a Doppler Derived Index Combining Systolic and Diastolic Time Intervals

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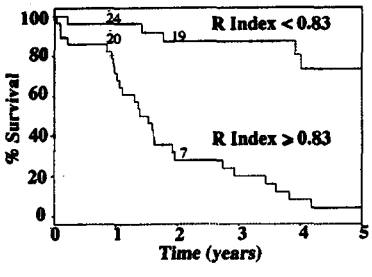
Primary Pulmonary Hypertension (PPH) is characterised by elevated pulmonary arterial pressure and vascular resistance, frequently producing right heart failure and death. We hypothesize that an Index combining right ventricular systolic and diastolic time intervals will have incremental value in ascertaining the stage, severity and prognosis of PPH. The easily obtained Doppler Index is the sum of isovolumic contraction time (ICT) and isovolumic relaxation time (IRT) divided by ejection time (ET). Normal Index was 0.28 ± 0.04. Index was assessed in 53 consecutive patients (age 45 ± 14) with PPH. ET was measured from the pulmonary outflow velocity signal. The sum of ICT and IRT was obtained by subtracting ET from the duration of tricuspid regurgitation (TR). Cardiac catheterization data were also included in the analysis.

Results: The Index tended to be elevated in comparison to normal ranges (median = 0.83). Univariately, the Doppler Index ($\chi^2 = 20.7$, $p < 0.0001$), TR severity ($\chi^2 = 8.2$, $p = 0.004$), cardiac index ($\chi^2 = 6.0$, $p = 0.015$), and NYHA class ($\chi^2 = 4.9$, $p = 0.026$) were associated with poorer survival. However, only the Index was found to be an independent predictor within the multivariate model.



Kaplan-Meier survival curve

Conclusion: Compared to previously established invasive and non-invasive indicators, the Doppler Index had the most significant prognostic value.

916-80 Role of Intraoperative Transesophageal Echocardiography in 43 Consecutive Patients Undergoing Cardiac Mass Removal

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To evaluate the role of intraoperative transesophageal echocardiography (TEE) in surgical removal of intracardiac masses, a total of 43 consecutive